

Claims

What is claimed is:

1. A device comprising:

an optically conductive tip for redirecting an optical signal, wherein said tip is in direct line of sight of one of the group consisting of at least one optical transmitter and at least one optical receiver; and

an optical conductor optically coupled to said tip, wherein said optical conductor is in direct line of sight of the other one of said group consisting of said at least one optical transmitter and said at least one optical receiver,

wherein the optical signal is transmitted by the optical transmitter and redirected to the optical receiver by the tip.

2. A device in accordance with claim 1, wherein:

said tip comprises one of the group consisting of an achromatic material, an infrared transparent material, achromatic polycarbonate, and infrared transparent polycarbonate; and

said optical conductor comprises one of the group consisting of an achromatic material, an infrared transparent material, achromatic polycarbonate, and infrared transparent polycarbonate.

3. A device in accordance with claim 1, wherein said optical signal comprises at least one of the group consisting of an infrared signal and a visible light signal.

4. A device in accordance with claim 1, wherein said tip and said optical conductor are integrally formed from a single piece of material.

5. A device in accordance with claim 1, wherein said tip is conical or frustum shaped and said optical conductor is approximately cylindrical.
6. A device in accordance with claim 5, wherein a portion of said optical conductor is positioned within said tip.
7. A device in accordance with claim 5, wherein said optical conductor is coupled to a base of said conical tip.
8. The device of claim 1, wherein the tip redirects the optical signal in a plurality of radial directions distributed around a longitudinal axis of the device.
9. The device of claim 8, wherein the tip distributes light omnidirectionally.
10. The device of claim 1, wherein the device is a stylus, and the tip is at the end of the stylus
11. An apparatus comprising:
 - a housing having a longitudinal axis;
 - a first optical device positioned within said housing;
 - an optically conductive tip mounted to said housing, an axis of said tip being coaxial with said axis of said housing, wherein said tip is in direct line of sight of a second optical device; and
 - an optical conductor that optically couples the first optical device to said tip,

wherein the first and second optical devices are optically coupled to each other by way of the tip and the optical conductor, regardless of an orientation of said housing about its longitudinal axis.

12. An apparatus in accordance with claim 11, wherein:

said first optical device comprises one of the group consisting of a single optical receiver and a single optical transmitter;

said second optical device comprises at least one optical transmitter if said first optical device comprises a single optical receiver; and

said second optical device comprises at least one optical receiver if said first optical device comprises a single optical transmitter.

13. An apparatus in accordance with claim 11, further comprising an optically conductive channel formed within said housing, wherein said channel is positioned between said optical conductor and said first optical device.

14. An apparatus in accordance claim 11, further comprising an ultrasonic transducer.

15. An apparatus in accordance claim 11, wherein:

said second optical device comprises at least one of the group consisting of a light emitting diode and a laser diode, if said first optical device comprises one of the group consisting of a photodiode and a photodetector; and

said second optical device comprises at least one of the group consisting of a photodiode and a photodetector, if said first optical device comprises one of the group consisting of a light emitting diode and a laser diode.

16. An apparatus in accordance claim 11, wherein said apparatus is stylus shaped.

17. An apparatus in accordance claim 11, wherein said tip is conical or frustum shaped.

18. A system for determining the position of a stylus, said system comprising:

a fixed transceiving portion for transceiving ultrasonic and optical signals,
said fixed transceiving portion comprising:

at least one ultrasonic transducer;

one of the group consisting of at least one optical
receiver and at least one optical transmitter; and

said stylus comprising:

an ultrasonic transducer;

one of the group consisting of a single optical transmitter
and a single optical receiver; wherein a position of said stylus is
determined in accordance with said optical signals and propagation
times of said ultrasonic signals.

19. A system in accordance with claim 18, wherein:

said fixed transceiving portion comprises:

a plurality of ultrasonic transducers; and

at least one optical transmitter; and

said stylus comprises:

a single ultrasonic transducer; and

a single optical receiver.

20. A system in accordance with claim 18, wherein:

said fixed transceiving portion comprises:

a plurality of ultrasonic transducers; and
at least one optical receiver; and
said stylus comprises:
a single ultrasonic transducer; and
a single optical transmitter.

21. A system in accordance with claim 18, said stylus further comprising:

an optically conductive tip mounted to said stylus, said stylus having an axis, wherein said tip is in direct line of sight of one of said at least one optical transmitter and said at least one optical receiver on said fixed transceiving portion, such that optical coupling between said tip and said at least one optical transmitter and at least one optical receiver on said fixed transceiving portion is maintained regardless of an orientation of said stylus about its axis;

an optical conductor optically coupled to said tip, wherein:
at least a portion of said optical conductor is positioned within said stylus;

said optical conductor is in direct line of sight of one of said single optical transmitter and said single optical receiver positioned within said stylus;
and

said tip is optically coupled to the other of said at least one optical transmitter and said at least one optical receiver on said fixed transceiving portion.